

Appl. No. 10/676,277
Amdt. dated May 14, 2007
Reply to Office action of February 12, 2007

Amendments to the Drawings:

Attached as an appendix to this amendment is a corrected drawing sheet showing an amended FIG. 3.

REMARKS

This amendment responds to the office action dated February 12, 2007.

The Examiner objected to the FIG. 3 of the drawings due to the lack of an arrow from box 110 to box 150. Attached is a corrected drawing sheet including the missing arrow. The applicant therefore respectfully requests that the objection to the drawings be withdrawn.

The Examiner rejected claims 1-17, 20, 22, and 23 under 35 U.S.C. § 102(b) as being anticipated by Benati et al., U.S. Patent No. 5,748,764 (hereinafter Benati). As amended, each of these claims distinguishes over Benati as explained below.

As amended, independent claims 1 and 7 include the limitation of “identifying a sub-region of said image as containing a red-eye region based upon, at least in part, processing said saturation channel by applying a saturation mask to one or more pixels of said image, said saturation mask comparing the standard deviation of the saturation value of a respective pixel to a threshold.” This limitation is not disclosed by Benati as conceded by the Examiner. *See* Office Action at p. 8 paragraph 2. Therefore, the applicant respectfully requests that the Examiner withdraw the rejection of claim 1 under 35 U.S.C. § 102(b).

The Examiner contends that Takaoka, U.S. Patent No. 6,798,903 teaches that red eye regions can be identified by comparing the difference between the saturation of a pixel and the average saturation of all pixels in a pupil. It does not. In the passages cited by the Examiner. Takaoka has *already* identified a red-eye defect and seeks to replace the defective pixels with ones having a more natural color, using values from a pupil *not* having the red-eye defect. To that end, Takaoka discloses that pixels in the defective pupil can be replaced with pixels set to the average luminance, hue, and saturation of the non-defective pupil. Alternatively, for an even more natural look, Takaoka discloses that it is best if all pixels in the pupil are not of a uniform saturation, hue, and luminance, and therefore suggests introducing variations in the pixels of the corrected pupil from the respective measured averages of the saturation, hue, and luminance from the non-defective pupil.

The Examiner asserts, without any support, that if “correction is done based on a standard deviation . . . it is implicit that identification can be done with a standard deviation.” *See* Office Action at p. 8. The Examiner’s logic is flawed. Takaoka discloses nothing more than *introducing* random noise into the channels of a replacement pupil, to compensate for the loss of information that results from previous step of averaging the color values of a model pupil. Takaoka does not measure the deviation from an average of pixels in either pupil, hence cannot correct *based on* a standard deviation. No inference can be drawn from this step as to whether noise, or variances from an average, is useful in detecting a specific image characteristic, such as red-eye.

For each of these reasons, independent claims 1 and 7 as amended distinguish over the prior art and should be allowable. Claims 2-6 and 8-11 each respectively depend from one of independent claims 1 and 7, and are patentable for the same reasons as are independent claims 1 and 7.

Independent claim 12, as amended, includes the limitations of “identifying a sub-region of said image as containing a red-eye region based upon, at least in part, applying a first mask to said first channel, said first mask comparing a first statistical measure of at least one pixel of said image to a first threshold” and “applying a second mask to said second channel, said second mask comparing a second statistical measure of at least one pixel of said image to a second threshold, said second statistical measure being a different statistical property than said first statistical measure.” These limitations are not disclosed by Benati. That reference applies first and second masks to first and second channels, respectively (See Benati at col. 4 lines 24-28 applying separate threshold masks to each of Hue, Luma, and Saturation channels), however each respective statistical measure that is compared to a threshold, in each of the three masks, is in all cases the measured value of the pixel. Hence, Benati fails to disclose the limitation of “said second statistical measure being a different statistical property than said first statistical measure.” Therefore, claim 12, as well as its dependent claims 13-17 patentably distinguish over the cited reference.

Independent claim 20, as amended, recites the limitation of “applying a convex hull technique to group remaining pixels of said image into a plurality of contiguous regions” and “thereafter applying a second mask to said hue channel, said second mask comparing the hue value of respective pixels in said plurality of contiguous regions to a second threshold.” These limitations are incompatible with the method of Benati, which first applies respective masks to all of the three image channels, and then, after identifying all candidate pixels for a red-eye defect, begins to identify contiguous regions based upon a disclosed “seed” technique. This seed technique not only assumes, but requires, that all masks be applied prior to segmentation into contiguous regions. *See* Benati at col. 4 line 51 to col. 5 line 5. Therefore, claim 20, as well as its dependent claim 22 patentably distinguishes over the cited prior art.

The Examiner rejected claims 18-19 under 35 U.S.C. § 103(a) as being unpatentable over Benati in view of Liang, et al., U.S. Patent No. 6,678,413. Each of these claims depends from independent claim 12, which was distinguished over Benati for the reasons stated earlier. Liang, also fails to disclose the step of “applying a second mask to said second channel, said second mask comparing a second statistical measure of at least one pixel of said image to a second threshold, said second statistical measure being different than said first statistical measure.” Therefore, independent claims 18-19 patentably distinguish over the cited prior art.

In addition, the applicant notes that the combination of Benati with Liang’s convex hull method is inappropriate. An asserted combination cannot change the principle of operation of the primary reference. *See* MPEP § 2143.01. The seed method disclosed by Benati, for computing a plurality of candidate red-eye regions, is clearly the primary principle of the invention disclosed therein. *See, e.g.* Benati at independent claim 1; *See also* Id. at col. 4 line 46 to col. 6 line 56. In fact, the only purpose for the threshold masks of Benati is to provide seed pixels for the specific grouping method of Benati. Therefore, it is not proper for the Examiner to reject any claims of the present application on the assertion that one of ordinary skill in the art would modify Benati to substitute a convex hull method for Benati’s seed method, while retaining Benati’s threshold masks.

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The Examiner rejected claims 21 and 24-26 under 35 U.S.C. § 103(a) as being obvious in view of the combination of Benati and Takaoka. Claims 24-26 have been canceled. Claim 24 is patentable over the cited combination for the same reasons as are claims 1, 7, and 20.

In view of the foregoing amendments and remarks, the applicant respectfully requests reconsideration and allowance of claims 1-23.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Kurt', followed by a long, wavy horizontal line that extends across the page.

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APPENDIX

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